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(2) a study of the galls of *Celtis occidentalis*; (3) a comparative study of structures. The work is exceptionally well done and well presented. There are 17 known species of zooecidia on the *C. occidentalis*. The acarinous and lepidopterous galls are kataplasma in character, and the hemipterous and dipterous galls protoplasma in character. This latter type is more closely comparable to the normal plant parts, but the tissue forms are new. The author very properly suggests that zooecidology presents a unique field for the study of problems pertaining to the mechanism used in the expression of hereditary characters.—MEL. T. COOK.

**Germination of rice.**—NAGAI<sup>31</sup> has made rather an extensive general study of the germination of rice, touching many points that have previously been worked out on other seeds. The cutinized inner integument of the ripe fruit is a semipermeable membrane. Such membranes have been found in the fruit walls of many grasses and in the coats of many seeds.<sup>32</sup> Desiccated seeds of rice are not injured by steeping for 24 hours in ether, chloroform, absolute alcohol, acetone, and other substances. This is in accord with the work of BEQUEREL and of SHULL,<sup>33</sup> who have found that the dry coats of many seeds are impervious to such substances, but that, as the water content of the coats rises, they become more pervious. Rice germinates in an extremely low partial pressure of oxygen, yet the germination is abnormal, the hypocotyl growing only under considerable oxygen pressure. Acids and bases show no stimulative effects upon the germination of rice. A few hours of exposure to liquid air does not injure the seeds of rice or buckwheat. Two hours' exposure to 97–98° C. kills *Zea Mays*, but does little injury to rice, especially if it is desiccated.—WM. CROCKER.

**Alkalies and salt absorption.**—As a phase in the analysis of the effects of alkalies upon the development of plants, BREAZEALE<sup>34</sup> has studied the effect of NaCl, Na<sub>2</sub>SO<sub>4</sub>, and Na<sub>2</sub>CO<sub>3</sub> upon the absorption of nitrates, phosphates, and potash by wheat seedlings. Up to 1000 ppm. in a nutrient solution they do not affect the absorption of nitrates. In this concentration NaCl does not modify phosphate absorption, but slightly depresses potash absorption. In 1000 ppm., Na<sub>2</sub>SO<sub>4</sub> depresses the absorption of potash and phosphoric acid to approximately 70 per cent of that of the checks. In equal mol concentration Na<sub>2</sub>CO<sub>3</sub> depresses the absorption of potash to 20 per cent and phosphoric acid to 30 per cent normal. With Na<sub>2</sub>SO<sub>3</sub> these depressing effects were evident in 300 ppm. The writer thinks the depressing effect of the Na<sub>2</sub>SO<sub>4</sub> is due to its

<sup>31</sup> NAGAI, ISABURO, Some studies on the germination of seeds of *Oryza sativa*. Jour. Coll. Agric., Imperial University Tokyo 3:109–155. 1916.

<sup>32</sup> BOT. GAZ. 56:169–199. 1913; 63:373–397. 1917.

<sup>33</sup> BOT. GAZ. 56:169–199. 1913.

<sup>34</sup> BREAZEALE, J. F., Effect of sodium salts in water cultures on the absorption of plant food by wheat seedlings. Jour. Agric. Research 7:407–416. 1916.

reaction with  $\text{CaCO}_3$  of the substratum, thus forming  $\text{Na}_2\text{CO}_3$ . Extensive studies of this sort can add much to our knowledge of the absorption of salts by plants and the intereffects of salts upon each other as regards absorption.—WM. CROCKER.

**Calcium compounds of the soil.**—Under this title<sup>35</sup> E. C. SHOREY, W. H. FRY, and W. HAZEN, members of the Bureau of Soils, have analyzed 63 soil samples of 23 types from 24 locations of 19 states. They have calculated the percentage of calcium combined with humus compound, calcium carbonate, calcium sulphate, and calcium as difficultly and easily decomposed silicates. They find a wide variation in total calcium content and in calcium carbonate and the two classes of silicates, and there was no constant relation between the total calcium content and the percentage of any of the calcium compounds. Calcium combined with humus compounds was absent in 29 soils. One type which is recognized as a good alfalfa soil is characterized by high calcium content, but low content of calcium carbonate. This indicates, as does other evidence, that alfalfa requires a rather high content of calcium ion as a nutrient or balancer of the soil solution, rather than merely calcium carbonate as a neutralizer of acidity.—WM. CROCKER.

**Phylogeny of ferns.**—BOWER,<sup>36</sup> in continuation of his phylogenetic studies of the ferns, has developed some interesting conclusions in reference to what he calls the “acrostichoid condition,” meaning the spreading of exposed sporangia “uniformly over a considerable area of the sporophyll.” This fact was the basis of the old genus *Acrostichum*, which BOWER has come to regard not as a natural genus, but as a state or condition which may have been attained along a number of phyletic lines. In the present paper he has presented a number of genera which he regards as “dipterid derivatives,” that is, derived from a phyletic stock characterized by *Dipteris*, which show various stages of advance toward the acrostichoid condition. According to this view, a number of so-called genera of ferns are form genera, not being what BOWER calls “phyletic unities.” The increasing evidence of parallelism in evolution is raising the question of “phyletic unity” in connection with all of our larger genera.—J. M. C.

**Pine forests of Virginia and the Carolinas.**—HARPER<sup>37</sup> recently devised a method for securing a rough quantitative analysis of vegetation from notes taken at frequent intervals from the car window or while walking through the country. He made such notes during 53 hours of railroad travel and 21 hours

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<sup>35</sup> Jour. Agric. Research 8:57-77. 1917.

<sup>36</sup> BOWER, F. O., Studies in the phylogeny of the Filicales. VI. Ferns showing the “acrostichoid” condition, with special reference to dipterid derivatives. Ann. Botany 31:1-39. pls. 1, 2. figs. 15. 1917.

<sup>37</sup> HARPER, R. M., Geography and vegetation of northern Florida. Ann. Rep. Fla. Geol. Survey 6:163-437. 1914.